

## Urban Planning

# ON EVALUATING THE CONDITION OF THE SAINT PETERSBURG HISTORIC CENTER

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### Abstract

**Introduction:** This study was prompted by the introduction of the urban environment quality index into the system operated by the Russian Ministry of Construction Industry, Housing and Utilities Sector (Minstroy). We note that the “environment-centric” methodologies were already worked on and applied to housing studies in Leningrad as far back as during the 1970–1980s, and that the insights from these studies can now be used for analyzing the current state of the urban environment. **Purpose of the study and methods:** The information reviewed in this article gives us the first glimpse of the tangible urban environment in the historic center of Saint Petersburg. Many features of this part of the city are reminiscent of other European metropolises, but the fact that the historic center is split into three parts by vast waterways, that the construction began from the ground up in the middle of the wilderness, and that the active urban development phase lasted only a century and a half (from the 1760s to the 1910s), has a major part to play. **Results:** We use quantitative data to describe the features of the Saint Petersburg historic center and compare our findings to the features of European metropolises, across such parameters as spatial geometry, transportation and pedestrian links, and environmental conditions. Our study reveals a number of issues that challenge the quality of life in this part of the city. We also offer a critique of the regional norms for construction and reconstruction in historic districts, which offer a biased view of the situation and do not offer any ways of optimizing it.

### Keywords

Historic center of Saint Petersburg, urban environment, multi-factor analysis, urban planning.

### Introduction

The execution of the Housing and Urban Environment National Project has breathed life into numerous activities relevant to urban development. In the context of strategic planning and public governance, much emphasis has been given to the multi-factor analysis of the urban environment and the qualimetric method of its assessment, which are now in active use (Urban Environment Quality Index, 2019).

The community of architects and urban planners had a particularly keen interest in the subject of the urban environment during the 1970s and 1980s, when the various definitions of this concept, both domestic and foreign, as well as its theoretical and practical aspects, were seeing extensive development and discussion (Gutnov, 1984; Kogan, 1982; Lynch, 1982, 1986; Vysokovsky, 1989, Yargina et al., 1986).

Today, some experts believe that it is best to stop discussing this, while others point to the multi-factor

nature of the “urban environment” concept<sup>1</sup>. It would be reasonable to assume that architects and urban planners will respond very positively to the tools for evaluating the tangible aspect of the urban environment and the conditions of urban environment formation, which have been introduced at the Minstroy. Multi-factor analysis has already proven to be effective when used as a means of meeting strategic goals. Therefore, we believe it justifiable to apply this methodology on the local level as well, for assessing the condition of urban districts.

### Subject, tasks, and methods

Methodologically, our study is founded on a comprehensive approach that includes the research and analysis of information available in print and online sources relevant to the urban development of Saint Petersburg. We also analyze graphics. The information reviewed in this article gives us the first glimpse of the tangible urban environment in the historic center of Saint

<sup>1</sup> See fragments of a discussion in Moscow in 2007. Bart Goldhoorn: a better word choice is “urban space”, not “urban environment”. I. M. Korobyina: An urban environment is something far bigger than a public space. Ye. V. Ass: Reducing an urban environment to architecture would be an oversimplification. This concept is far more complex. We can view it as an integrated whole, founded on the social, technological, sanitary, hygienic, and environmental aspects. Then there is the aesthetic aspect, which both brings all of this together and exists as its own entity (Fanaylova, 2007).

Petersburg. Many features of this part of the city are reminiscent of other European metropolises, but the fact that the historic center is split into three parts by vast waterways, that the construction began from the ground up in the middle of the wilderness, and that the active urban development phase lasted only a century and a half (from the 1760s to the 1910s), has a major part to play.

**Results and discussion**

**Saint Petersburg historic center area.** Starting from 2002, Saint Petersburg has been applying regional-level regulations to reconstructing its historic districts, with special emphasis on open-air public spaces. The urban (urban planning) environment is defined as “a system of streets, embankments, parks, public gardens, water

bodies, buildings, structures, and other elements that make up an urbanized space where the urban population engages in various everyday activities” (TSN 30-306-2002 (Administration of Saint Petersburg, 2003)).

We are suggesting a study that is founded on the environment-centric approach and assesses the quality of life in the part of the Saint Petersburg city center that is classified as a World Heritage Site and covers an area of 5356.8518 ha (Saint Petersburg Union of Restorers, 2019). The historic center of Saint Petersburg — which is classified as a “federal city” — accounts for approximately 3% of the city territory and over 10% of its population. In terms of aggregate parameters of use intensity, the center of Saint Petersburg is comparable to such metropolises as Paris or Rome (Table 1).

Table 1. Intensity of urban space use

Parameter	City				
	Saint Petersburg		Paris		Rome
	Historic center	City	City	Agglomeration	See Note 2
Area size (km <sup>2</sup> )	53.57	1439	105.4	814	1287.36
Population (thousands of people)	See Note 1	5361	2202	10,620	2,875,805
Population density (people per km <sup>2</sup> )		3837.41	20,781	13,050	2234

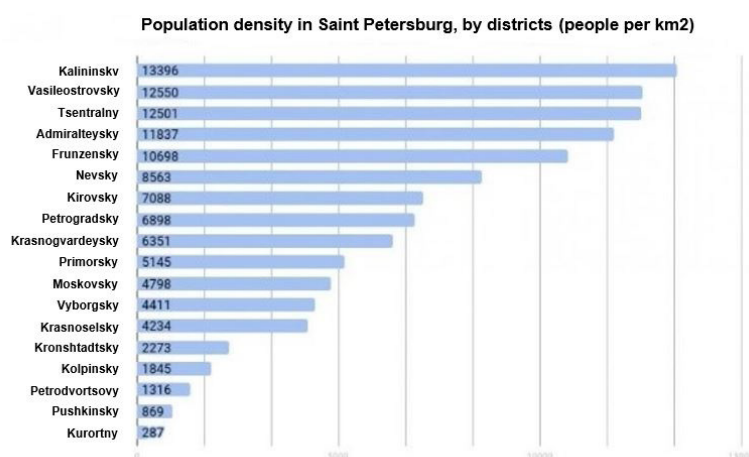
Note 1. According to Territorial Construction Regulations TSN 30-306-2002, “The historic center limits coincide with the administrative boundaries of Admiralteysky, Vasileostrovsky (except for the northwestern part of the island), Petrogradsky, and Tsentralny Districts”. Consequently, the statistics for the districts listed in the TSN reflect the ways in which the population uses the historic center of Saint Petersburg:

Admiralteysky District — population 162 thousand people, area size 13.82 km<sup>2</sup>, population density 11,387 people per km<sup>2</sup>

Tsentralny District — 216,939 people, area size 17.12 km<sup>2</sup>, population density 12,501 people per km<sup>2</sup>

Vasileostrovsky District — population density 12,550 people per km<sup>2</sup>

Petrogradsky district — population density 6898 people per km<sup>2</sup>



(Yemtsov 2019)

To summarize, the average population density of the city center (even counting an outlier like Petrogradsky District) is 10,843 people per km<sup>2</sup>

Note 2. In Rome, urbanized development does not amount to more than approximately one fourth of the area within the city limits, so the actual population density here approaches 10,000 people per km<sup>2</sup>

Fig. 1 is a fragment of a Saint Petersburg city plan, which helps highlight the general impression of the nature of the urban environment in the center



Fig. 1. Fragment of a plan of the Saint Petersburg center

### List of main urban environment parameters in the Saint Petersburg city center

During an assessment of the urban environment conditions in 2002, the following observation was included in the regional regulations: “the historic city center has the most complete urban design, historical and cultural value, usage intensity, and functional diversity”. These regulations focus mostly on the spatial parameters of the city center, which is described as having “a high usage intensity, ... a dense street and road network, ... small blocks with high development density, a perimetric layout of residential development, compact spaces within the residential blocks, and well-developed intra-block pedestrian pathways” (Administration of Saint Petersburg, 2003). However, there is no concrete evidence to support

these statements. Nor is any attention paid to the insights into the urban environment conditions that were gained by urban researchers over the previous period.

The work of the graduates from the Institute of Civil Engineers during the 1920s and 1930s was the precursor of the environment-centric approach. This school of thought was known for its pragmatic take on resolving various issues of urban development. A. S. Nikolsky in particular noted that it was unacceptable to rely on intuition alone; he believed that even in spatial planning, “aesthetic taste needs to make way to a scientific approach” (Barkhin et al., 1975). A. V. Samoylov, in turn, highlighted the multi-aspect nature of architect’s work and called for interpreting an architectural structure as “an element of the urban planning complex and synthesis of technology, economics, artistic concept, and functional purpose” (Barkhin et al., 1975). In the 1970s, these ideas inspired researchers from LenNIIProekt and Leningrad Civil Engineering Institute (LISI), who took an interest in housing quality assessment as multi-factor analysis, basing it on the qualimetric method, which had just started gaining prominence at the time (Azgaldov and Raykhman, 1973; Azgaldov and Senderova, 1977; Lavrov et al., 1981). Their research was based on a broad range of parameters, including those shared by the Leningrad Zonal Research Institute of Experimental Design and the Leningrad Research and Design Institute for the Elaboration of Master Plans and Development Plans (Makhrovskaya, 1974; Platonov et al., 1973).

Urban life in the center of Saint Petersburg has changed dramatically since then, and most of the urban environment data from the aforementioned studies has lost relevance. Therefore, the current priority goal is to create a new, up-to-date reference database. The urban environment monitoring system has also changed over the recent years, and the scope of publicly accessible data has shrunk; as a result, the objectives tree that we are proposing at this stage of our research (Table 2) may be considered a gateway into an immensely vast field.

Table 2. Features of the urban structure

1.Spatial geometry		2. Communication links		3. Environmental factors		4. Usage		Public infras tructure
1.1. Open-air public spaces	1.2. Residential spaces (blocks)	2.1. Transport links	2.2. Pedestrian links	3.1. Green spaces, access to water	3.2. Environ mental conditions	4.1. Land management	4.2. Operating conditions	

### 1. Spatial geometry in the city center

**1.1. Open-air public spaces.** The Saint Petersburg Strategy for Preserving the Cultural Heritage highlights the importance of those parts of the cityscape that reflect the three-dimensional spatial layout of the city center, namely the configuration of the central waterways, the city skyline, the river panoramas, the architectural ensembles of the major city squares, and the layout of the main streets (Repository for legal documents, standards, regulations and specifications, 2019b). The open-air public space configuration in the historic city center has remained largely unchanged since the beginning of the 20<sup>th</sup> century.

The period between the 1760s and the 1830s (and also, in part, the early 1840s) contributed the most to the formation of Saint Petersburg open-air public spaces. Active urban development began with Catherine the Great’s decision to “make the orderly state and condition and magnificence of Saint Petersburg such as befits the capital city of a realm most vast” (Punin, 1990). This desire to make Saint Petersburg a proper representative of its nation was also shared by Alexander I. The construction projects on the banks of the Neva embodied the “passionate love towards anything gigantic, anything colossal in its physical dimensions” (Grabar, 1910), which

was typical of that era in history. A gargantuan size was what set apart the landmark architectural monuments and other urban structures of that period. The first large-scale development project involved restructuring the central waterways. The Catherine Canal was deepened, the river beds were reshaped in a more streamlined way and surrounded with standardized urban structures along the banks, over 30 km of embankments were cased in granite, and the architectural complex on the Spit of Vasilyevsky Island began to take shape. The second major initiative was the transformation of the glacis surrounding the Admiralty fortress: it gave way to an enormous complex of central city squares, which served as a link between the Neva water area and the architectural ensemble of the Admiralty. This created a “single, uninterrupted open-air space, bringing together numerous waterways, squares, avenues, streets, and small parks” — the foundation for the landscape in the historic core of Saint Petersburg (Shvidkovsky, 2007).

The system did suffer significant losses during subsequent reconstruction: by the early 20<sup>th</sup> century, the Admiralteyskaya and Kollezhskaya squares had ceased to exist, the Teatralnaya Square had lost some of its aesthetic, and the panorama over the 400-meter-long main facade of the Admiralty building had been blocked out. The repurposing of the spacious (50 ha) glacis around the Peter and Paul Fortress lacked a systemic approach and therefore can hardly be considered a positive development. These acts of “barbaric urban planning” (Lisovsky, 2004; Roslavlev, 1928) have so far gone unnoticed. The claim that the urban environment in the historic city center has properly completed its development is being promoted by territorial regulations (TSN 30-306-2002) and shared by a number of distinguished experts.

In the 1920s, the city center stopped undergoing active development. The spatial layout remained the same as at the beginning of the 20<sup>th</sup> century up until the 1990s. The conservation of open-air public space parameters is

a matter of special importance in Saint Petersburg. The conservation efforts focus on the landmarks that define the aesthetic of the streets, squares, and embankments. The Committee for the State Preservation of Historical and Cultural Monuments (KGIOP) maintains a list of 2110 heritage buildings, while 7783 sites — “architectural ensembles, buildings and utility structures, parks and gardens, ponds and canals, monumental sculptures and park ornaments, historical burial sites and points of archaeological interest” — are protected by the state.

**1.2. Residential spaces (blocks).** The total area covered by residential blocks in the center of Saint Petersburg is believed to reach 2114 ha (MLA+ 2019). Unlike the open-air public spaces, which have seen thorough studies and systemic classification, the vast spaces that have been “tucked away” into residential blocks remain a terra incognita. Even today, we are still lacking an appropriate expert-level description of these areas. Territorial regulations describe intra-block spaces as “buildings, structures, and other elements” forming a part of a system that “...makes up an urbanized space where the urban population engages in various everyday activities”. The statement that the historic center has “small blocks with high development density, a streamlined development module, and a perimetric layout of residential development” (TSN 30-306-2002) appears rather contradictory.

It is widely known that even at the earliest stages of the city’s development, residential blocks already spanned across incredibly vast areas: their size reached 210 x 66 sazhen (447.3 x 140.6 m) on Vasilyevsky Island and 220–225 x 50–56 sazhen (426–553.8 x 106.5–110.7 m) in the Moskovsky (Liteyny) district. This type of development was later used as guidelines for settling uninhabited areas (Sementsov, 2006a). Fig. 2 allows us to compare the spatial parameters of residential development in the center of Saint Petersburg and Paris; this comparison clearly disproves the statement in the regional regulations that we just cited.

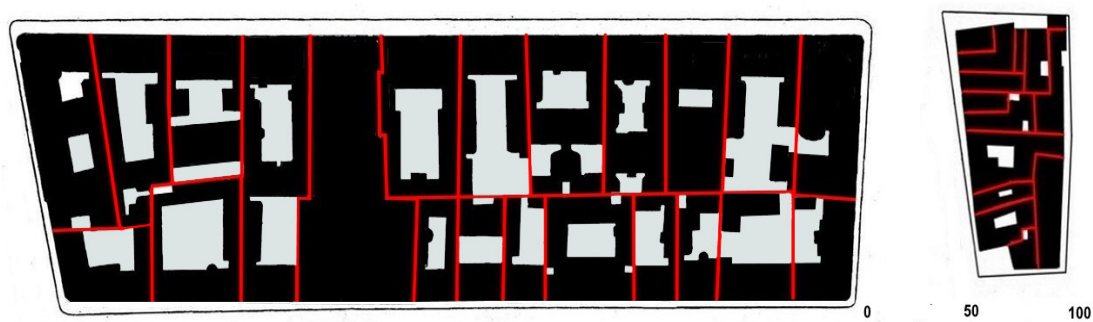


Fig. 2. Residential development in the city center: on the left — Saint Petersburg (block 1220 between Nevsky Prospekt and Stremyannaya Street), on the right — Paris (Beaubourg area, Place Igor-Stravinsky)

It is far from difficult to determine the perimeter of residential blocks in the historic area of Vasilyevsky Island. It is 1174 m. Notably, the average perimeter of urban residential blocks is 746 m in the center of Saint Petersburg, 465 m in Rome, 308 m in Paris, and 217 m in

London. The average residential block in Saint Petersburg is five times bigger than its Parisian counterpart (Yavein, 2012).

The large size of the residential blocks also defined their development typology. Figs. 1 and 2 show that the



center of Saint Petersburg is dominated by a “grid-like segmented layout of the compact perimetric morphotype” (Kozhaeva, 2011). It differs from the historic centers of older cities, including Paris, in that it has a well-developed and consistently structured courtyard system within the residential blocks.

In historic European cities, residential block depth rarely exceeded 30–40 m, and houses usually received natural light from street-facing windows, which could be occasionally supplemented with light wells of minimum

size<sup>2</sup>. In New York, the size of inner courtyards in residential development areas occupied by five-story buildings reached 26 m<sup>2</sup> (Architecture and Urban Planning, 2019).

In Saint Petersburg, the residential buildings and their wings located in the central part of the block received natural light through a courtyard system. A study conducted in the 1970s shows that the Saint Petersburg cityscape is dominated by residential blocks that are 40–140 meters wide, while the most common type of intra-block layout is a rectangular courtyard framed by buildings along the perimeter (Fig. 3).

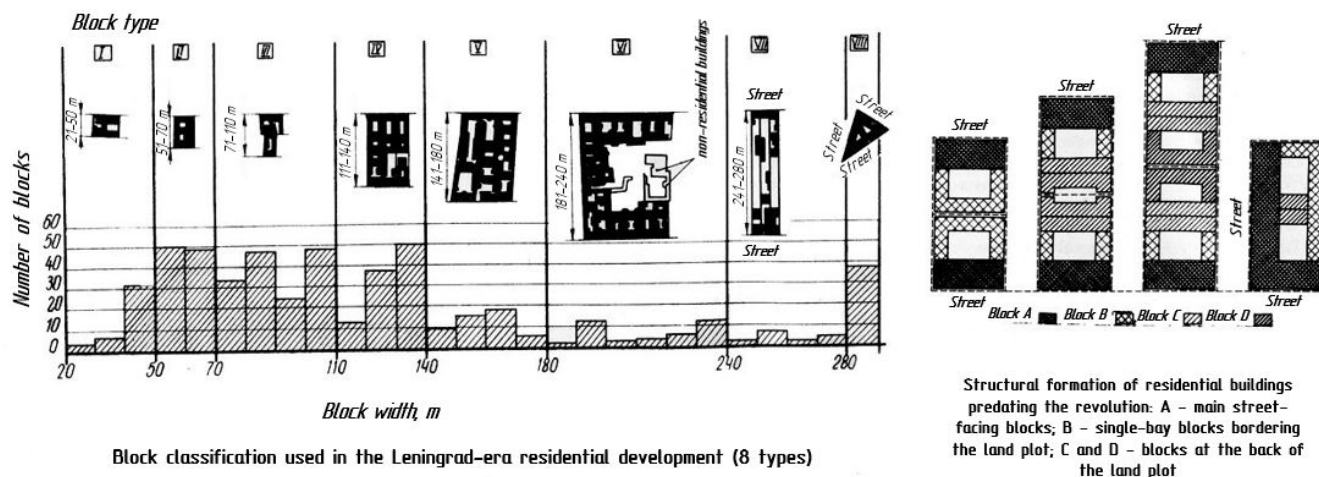


Fig. 3. Spatial parameters of intra-block areas in the historic center of Saint Petersburg (Platonov et al., 1973)

As the city kept developing, residential areas became more tightly packed, while intra-block lighting worsened: new stories were added on top, additional wings were crammed into the land plots, and the officially permitted courtyard size kept shrinking. In the 1760s, the norm was 21.5 x 42.6 m (894.4 sq. m); and in 1835, the official threshold for small-size land plots could be as low as 10.7 x 12.8 m (136.1 sq. m). Starting from 1882, the 136.1 sq. m size was the official recommendation for the main courtyard on the land plot; notably, the permissible width was cut down to 6.4 m (Sementsov, 2006b).

When comparing Figs. 2 and 4, we see that the “grid-like segmented layout of the compact perimetric morphotype” in the center of Saint Petersburg underwent significant changes in the late 19<sup>th</sup> and especially in the early 20<sup>th</sup> century: the new land plot parameters were not compliant with the traditional development module, the continuous chain of building facades got broken up by cour d’honneurs, firewalls were preserved in fragments only, and instead of 1 or 2 courtyards per plot, there were now as many as 5–11.

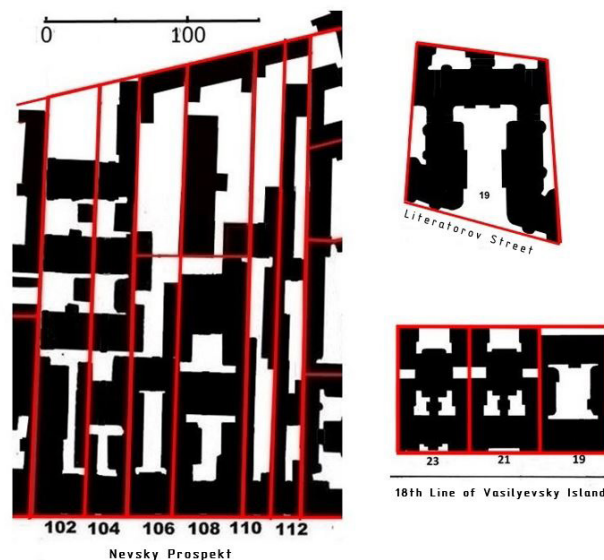


Fig. 4. Spatial parameters of land plot development in the late 19<sup>th</sup> and early 20<sup>th</sup> century

<sup>2</sup> In Paris, even as recently as in the early 1930s, the minimum permissible size of an inner courtyard could reach 30 m<sup>2</sup>; for courtyards facing utility rooms only (including servants’ quarters), the threshold could be reduced to 8 m<sup>2</sup> (Reglement sur les hauteurs et les sail lies des batiments dans la villc be Paris 18 sept. 1902. Arrete du 22 Juin, 1904).

The development within the residential blocks contrasted against the open-air public spaces. The aesthetic aspect had barely any role to play in urban planning now, giving way to pragmatic goals. A single composition module would often be no bigger than a dozen meters, and would rarely reach 30–40 meters. Rather than being strictly regulated, city planning was predominantly spontaneous. Modern researchers point to the unique nature of this “extraordinary example of new structural formation”, which they call “anti-architecture” (Kirikov, 2004). This “different Petersburg” is now recognized as an “inextricable part of the urban whole” and an “under-appreciated chronicle of the city’s culture” (Kozyreva, 2015).

**Communication links.** The role of the transport and communication links as a defining element of urban development first became evident in Saint Petersburg during the latter half of the 19<sup>th</sup> century. As the construction hotspot kept expanding, new alleyways were added to the city layout, in order to improve Nevsky Prospekt links with the adjacent city districts: towards Nadezhdinskaya Street (now Mayakovskogo Street) in 1858, towards Pushkinskaya Street in 1874, and towards Suvorovsky Prospekt in 1900. Later on, such additions were deemed a palliative measure, and some suggestions were voiced regarding a complete transformation of the entire central street network (Enakiyev, 1912). However, unlike in many other European cities, the reconstruction efforts of the latter half of the 19<sup>th</sup> and early 20<sup>th</sup> century only affected

a limited segment of the transportation route network in the Saint Petersburg center. The route layout that we are seeing today has been preserved since the early 1840s when the streets in the Saint Petersburg center were considered a structural part of the open-air public spaces, and the relevant tracing and spatial planning solutions had to account for the idea that the capital’s urban environment was representative of the whole nation.

The regional regulations claim that the modern Saint Petersburg city center is characterized by a “dense street and road network... and well-developed intra-block pedestrian pathways”, yet do not provide any concrete data to verify this (TSN 30-306-2002). According to the information provided in the Regional Strategy for the City Transportation Development, the street density in the center of Saint Petersburg is recorded at 11 km per 1 sq. km (Official Website of Legal Information 2019). In the historic part of Vasilyevsky Island, the figures tend to drop to 7.6 km per sq. km, as shown by our calculations. When assessing the situation, we could take into account that the average citywide street-and-road network (SRN) density (km per sq. km) is 12.4 in New York, 15.0 in Paris, and 16.9 in Barcelona (Pavlikova, 2013). In light of the above, the statement that Saint Petersburg has a “dense street and road network” in its center lacks factual foundation: the parameters of the Saint Petersburg city center fall behind even the averaged values characterizing the entire area of major cities in other countries (Table 3).

Table 3. Street and road network (SRN) density in the largest cities

Parameter	City				
	Saint Petersburg		Paris	London	New York
	City average	Historic center	City average		
Number of cars per 1000 people	330		253	213	305
SRN density (km per km <sup>2</sup> )	3.8	11.6	15.0	9.3	12.4
SRN size (m <sup>2</sup> per 1 person)	10				32
Sources					
(Nikolayenko, 2015; Studme.org, 2019)					

The traffic load on the urban environment has increased manifold over the recent years. In the early 20<sup>th</sup> century, there were fewer than 10 thousand cars in Saint Petersburg; in 1970, the number rose to approximately 40 thousand; and in 2017, it reached 1.68 million (Kommersant, 2018; Za Rulem, 2019). Official sources claim that currently, “the central area... of Saint Petersburg is suffering from drastic SRN overload, as well as from the resulting environmental degradation, which may increase even further due to rising

motorization rates if no measures are taken to resolve the issue” (Official Website of Legal Information, 2019). It is quite obvious that the SRN has reached its full capacity. Another observation is that the system that was developed to facilitate travel within Saint Petersburg “is far from the generally accepted norm. There is a need for reducing the traffic load and better utilizing the resources offered by pedestrian pathways” (Albin, 2016). On the other hand, the pedestrian pathway system in the center of Saint

Petersburg is distinguished by the minuscule share of lanes, walkways, and alleys within the residential blocks. The pedestrian space is limited to a sidewalk system that flanks the red line along the blocks' extensive perimeter.

The optimal layout for the best balance between comfortable driving and walking is believed to be "blocks with a lateral dimension of 80–110 m" (RBC, 2018), or 100–150 m (Fomina, 2014). The historic center of Saint Petersburg is dominated by elongated blocks that do not meet the recommended specifications. For instance, the English Embankment is 1.3 km long but borders a mere 3 residential blocks. At the southern end of Nevsky Prospekt (from Liteyny Prospekt), residential blocks stretch as far as half a kilometer; while the Fontanka bank between Nevsky Prospekt and Pestelya Street is home to 800-meter blocks. Even in the former military districts, with their average-sized blocks, the distance between crossings can be as large as 280–320 meters (Sementsov, 2006a).

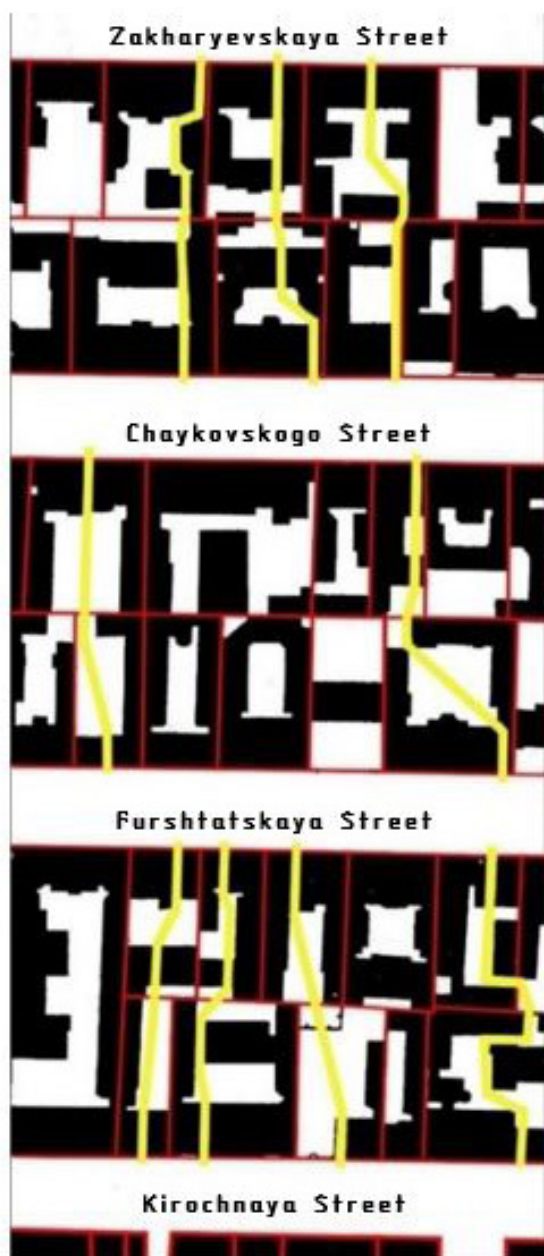


Fig. 5. Double-exit courtyards in the central residential blocks (1970–1990s)

The state of the environment along the sidewalks of the overloaded traffic lanes prompts a very negative response. Pedestrian safety is also a matter of concern. Pedestrians account for over 60 percent of all fatalities on the Saint Petersburg roads, as well as for a major share of injuries received in road accidents (Official Website of Legal Information, 2019).

The number of road accidents in the Admiralteysky and Tsentralny Districts exceeds the city-wide average twofold (Likhacheva, 2001). In some cases, pedestrians are injured by cars that veer off the road into the sidewalk. The General Administration for Traffic Safety (GIBDD) acknowledges that Nevsky Prospekt has "unfavorable traffic safety conditions": there were 73 road accidents here in 2018, with 3 people dead and 88 injured; in 2019, the general figures remained the same, but the number of fatalities rose twofold (Kudin, 2019).

An analysis of the situation prompts a conclusion that pedestrian pathways in the center of Saint Petersburg need to be separated from traffic (Shesterneva, 2007). The regional regulations mentioning "well-developed intra-block pedestrian pathways" suggest that this might be possible (Administration of Saint Petersburg, 2003). However, what is truly reflected in this statement is the situation unique to the period from the 1960s to the 1980s, when the urban development conditions allowed the locals to create their own pathways by taking shortcuts across the residential blocks (double-exit courtyards). The spontaneous emergence of these pedestrian links made the urban environment in the center more passable, which it had sorely needed (Fig. 5).

This pedestrian network is now being actively dismantled, and many double-exit courtyards are getting closed off. When they just emerged, the city administration was indifferent (it did not even make any attempts to record their existence); nor is it taking any steps to preserve this system today (812 Online, 2014).

The current strategy includes suggestions on "reconstructing the sidewalks to reflect the actual pedestrian traffic intensity, designing high-comfort areas, and adding pedestrian zones to the historic center of Saint Petersburg" (Official Website of Legal Information, 2019). This is supposed to involve redistributing the limited space in the city center and splitting it between vehicles and pedestrians, which will inevitably result in conflicts.

**Environment. Natural features.** The center of Saint Petersburg has an unmatched potential when it comes to bodies of water: "The astounding balance between architectural landmarks and waterways is the key distinguishing feature of the Saint Petersburg historic center, as well as its main source of appeal... The bountiful waters of the Neva River have given the city its unrivaled scale and visual splendor; the river is Petersburg's main square and central street" (Committee for the State Preservation of Historical and Cultural Monuments, 2019). The waterway density at the historic core of the city fluctuates between 17.4 m per ha (Admiralteysky District) and 12.7 m per ha (Tsentralny District), which is significantly higher than the figures for the peripheral districts (Shundrina, 2017). In addition to other benefits, the broad rivers and canals help ventilate the city streets,



by carrying fresh breezes from the Gulf of Finland into the historic central districts.

The size of green areas in the center of Saint Petersburg is 6 sq. m per capita, which is 2–3 times less than at the city’s periphery (Repository for legal documents, standards, regulations and specifications, 2019a). Now for the air quality: in 2013, Saint Petersburg was named one of

the most polluted cities in Russia. Air pollution is the worst in the Admiralteysky, Tsentralny, and Vasileostrovsky Districts (78.house, 2019). 85.9% of atmospheric emissions come from cars. Air quality tends to deteriorate along the streets in the historic center (Ligovsky Prospekt and Obvodny Canal, Liteyny, Vladimirsky, and Zagorodny Prospekt, the vicinity of the Moskovsky railway station terminal)(Yandex.Realty, 2019).

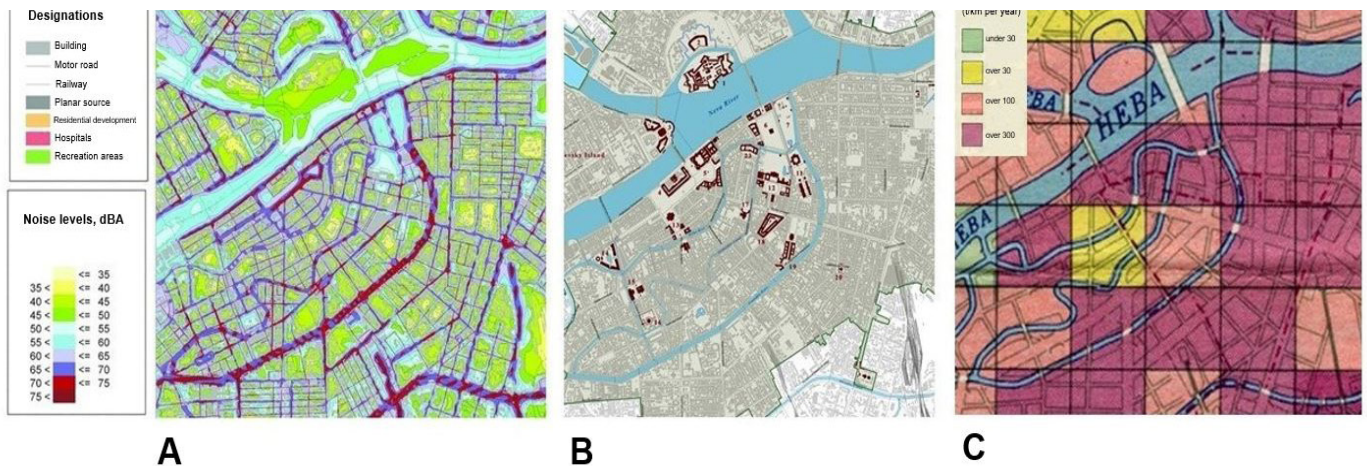


Fig. 6. Environmental conditions in Saint Petersburg. A — noise pollution in the city center (Karpovka, 2017), B — architectural landmarks in the city center (Unesco, 2019), C — atmospheric emissions (78.house, 2019)

Saint Petersburg ranks fifth among the noisiest metropolises in the world. The territories subjected to the greatest sound pressure are the Admiralteysky, Tsentralny, and Petrogradsky Districts. As shown in Fig. 6A, the main source of noise in the city center is the traffic flow.

This diagram allows us to conclude that the intra-block areas, which are insulated from noise and emissions by a solid row of street-facing buildings along the red lines, manage to retain a relatively comfortable environment quality. That said, there are certain depressed areas at the core of the residential blocks, even in the gentrified “golden triangle”. “In major blocks with a complex structure, the development would often stop before it reached the core, and with time, the unfinished spaces became deserted and dilapidated” (Yavein, 2012). Intra-block residential spaces were originally meant for low-income tenants with modest demands, so they did not have a particularly high consumer appeal (Yukhnyova, 2008). And today, their parameters often do not meet even the minimal sanitation and hygiene requirements (Kovalev, 2019). There was an attempt to clear intra-block spaces of “low-value buildings in the courtyards” during the 1960s (Ikonnikov, 1965). In a market economy, residential premises located in side wings are hardly of any interest to potential buyers (Lapechenkova, 2013), and no-one “as much as thinks of relocating people from communal flats in the second- and third-tier courtyards” (Saint Petersburg Projects, 2019). These sections of intra-block areas may have the potential for future reconstruction.

**Terms of land ownership and use.** The 2010s saw the development of various projects aimed at developing intra-block spaces in the center of Saint Petersburg for public benefit (Administration of Saint Petersburg, 2013). Much time has passed since then, but none of these

projects have ever become a reality, because active urban development in the historic center is stunted due to the lack of clarity in the land use system. Between 1703 and 1918, the city’s development was based on the private home ownership principle: the land plot and the buildings on it were considered a single business unit and served their proprietor as a source of income. The landlords collected income from apartment tenants and paid taxes. They were also the sole party responsible for making decisions regarding property renovation (as dictated by their business circumstances). This arrangement, recorded as an underlying clause in 1910, is illustrated in Fig. 7. The white color corresponds to state-owned land (in this case, the street), and the yellow corresponds to private land.

Between 1918 and 1991, the entire city and the buildings in it were the property of the state (“the people”). This arrangement is shown in the section of the figure that corresponds to the year 1960. The final section of the figure illustrates the modern arrangement (as of 2010). The housing reform resulted in most of the apartments being privatized (as shown in the figure by multiple colors). The stairwells and passages under the buildings were given to the tenants for shared use (yellow color).

And finally, the streets and those apartments that were not privatized are still city property (white color). The cross-hatching stands for the courtyards with unclear terms of land use: there is no land tax levied on this part of the plot, the ownership rights belong to the city, but in most cases, the courtyards are used by the building’s tenants, who keep the gates closed and do not allow trespassing. This type of home ownership and land use does not provide any economic incentives for development, while the legal aspects of decision-making are extremely fuzzy.



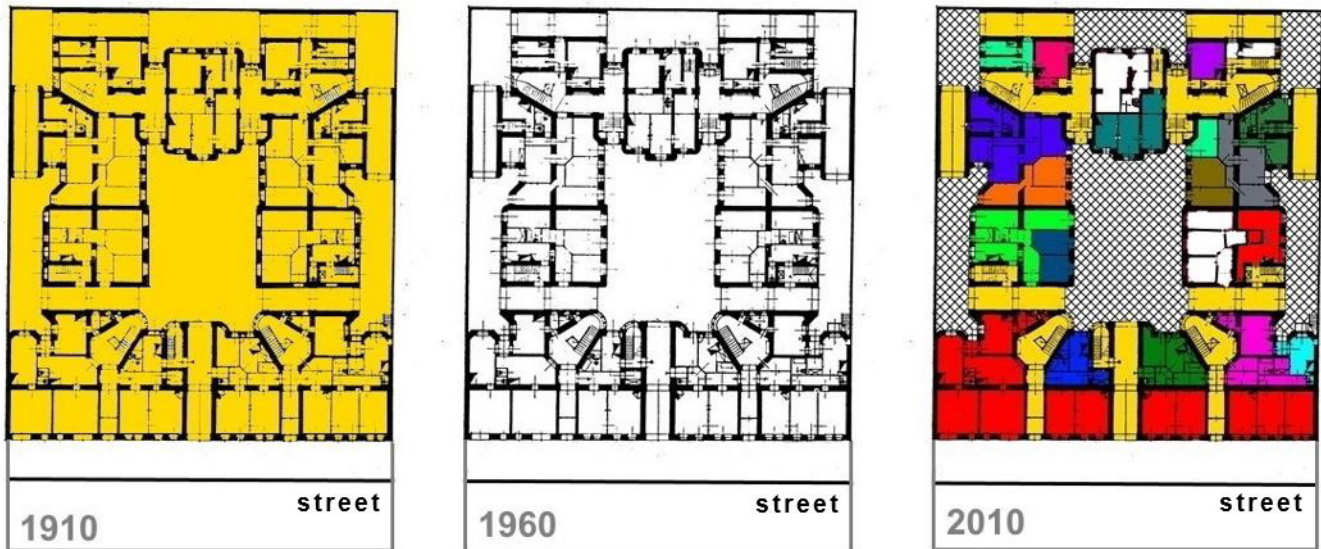


Fig. 7. Changes in the terms of land ownership and use

Architects lament that ‘the building owners privatize adjacent areas, thus taking them away from the city... the courtyards get blocked off, and stop being city property’ and point to ‘the lack of a coherent urban planning strategy and fence-sitting on the part of the city administration’ (Fanaylova, 2007). The legislation flaws make themselves quite evident: ‘Both the federal laws and municipal guidelines for construction business are far from perfect. In addition to causing legal conflicts, they create a breeding ground for corruption’ (Olkhovskaya, 2012). High-profile experts believe that this issue is strategic in nature and was caused by the haphazard housing reform: ‘For the longest time, the country trapped itself in an institutional conundrum. We are still there today’ (Yasin, 2006).

### Conclusions and recommendations

The multi-factor analysis of the *historic center of Saint Petersburg* reveals that the specifics of everyday life in this part of the city have been defined by the course of the city’s growth and development. The formation of the spatial environment in the historic center ‘completed (or abruptly came to a halt) a hundred years ago, and has not seen any dramatic changes since’ (Kirikov, 2014). The historic center of Saint Petersburg has received international recognition for its outstanding architecture and aesthetics, and is officially classified as a World Heritage Site (Administration of Saint Petersburg, 2015).

The everyday life in the *historic center of Saint Petersburg* is currently affected by:

– unsafe environmental conditions (noise and emission pollution) caused by traffic overload;

- unresolved issues of land ownership and use;
- dilapidated areas within residential blocks;
- low pedestrian network density; low levels of pedestrian safety and comfort;
- small share of green areas;
- extensive strain on the historic public spaces.

The conceptualization of the ‘Reconstruction and Development of Historic Districts in Saint Petersburg’, as per the Territorial Construction Regulations (TSN 30-306-2002), requires a major overview. As demonstrated above, the regulations reference a subjective assessment of the situation, with no factual evidence. Furthermore, the document focuses solely on the spatial parameters of the open-air infrastructure and does not cover the vast areas within residential blocks. Nor does it reflect the issues affecting reconstruction efforts due to the unfavorable traffic and environmental conditions in the city center.

Saint Petersburg’s official strategy for preserving the cultural heritage promises ‘certain benefits’ to compensate for ‘some discomfort associated with living in specially protected areas’ (Repository for legal documents, standards, regulations and specifications 2019b). But, as we have seen above, this ‘discomfort’ is currently exacerbated even further, as the traffic load on the historic center keeps growing. Making adjustments to the street and road network would be impossible in this part of Saint Petersburg out of historical conservation concerns, so the only way out of the situation would be to improve the pedestrian pathway system and make central residential blocks ‘publicly accessible, to pedestrians at least’ (Linov, 2012a, 2012b).

**References**

- 78.house (2019). *Environmental conditions in Saint Petersburg*. [online] Available at: <https://78.house/wiki/ehkologija-sankt-peterburga/> [Date accessed 12.12.2019].
- 812 Online (2014). *Does Petersburg need double-exit courtyards?* [online] Available at: <http://www.online812.ru/2014/03/07/011/> [Date accessed 02.04.2019].
- Administration of Saint Petersburg (2003). Territorial Construction Regulations TSN 30-306-2002. Reconstruction and development of Historic Districts in Saint Petersburg. Saint Petersburg: Stroyizdat, 71 p.
- Administration of Saint Petersburg (2013). Public spaces in Saint Petersburg spark discussion. [online] Available at: [https://gov.spb.ru/gov/otrasl/c\\_econom/news/41207/](https://gov.spb.ru/gov/otrasl/c_econom/news/41207/) [Date accessed 25.03.2019].
- Administration of Saint Petersburg (2015). Saint Petersburg and world heritage. [online] Available at: [http://gov.spb.ru/gov/otrasl/c\\_govcontrol/sovet/](http://gov.spb.ru/gov/otrasl/c_govcontrol/sovet/) [Date accessed 25.02.2019].
- Albin, I. N. (2016). General Plan of St. Petersburg for 2019–2014: strategy and tactics. *Administrative Consulting*, 1, pp. 64–67.
- Architecture and Urban Planning (2019). Evolution of planning and developing residential blocks. Experiments of A. Rey, W. Gropius, and Le Corbusier. [online] Available at: <http://townevolution.ru/books/item/f00/s00/z0000016/st014.shtml> [Date accessed 12.05.2019].
- Azgaldov, G. G. and Raykhman, E. P. (1973). *On qualimetry*. Moscow: Izdatelstvo Standartov, 172 p.
- Azgaldov, G. G. and Senderova, O. M. (1977). *Quality assessment and certification in construction*. Moscow: Stroyizdat, 88 p.
- Barkhin, M. G., Ikonnikov, A. V., Matsa, I. L., Orlov, G. M., Stupin, V. I. and Yaralov, Yu. S. (eds) (1975). *Masters of Soviet architecture on architecture: selected excerpts from letters, articles, presentations, and scholarly works: in 2 volumes*. Vol. 1. Moscow: Iskusstvo, 541 p.
- Committee for the State Preservation of Historical and Cultural Monuments (2019). Retrospective Statement of Outstanding Universal Value of the World Heritage Site “Historic Center of Saint Petersburg and Related Groups of Monuments”. [online] Available at: [http://kgiop.gov.spb.ru/media/uploads/userfiles/2015/08/24/%D0%94%D0%B5%D0%BA%D0%BB%D0%B0%D1%80%D0%B0%D1%86%D0%B8%D1%8F\\_%D0%92%D0%A3%D0%A6.pdf](http://kgiop.gov.spb.ru/media/uploads/userfiles/2015/08/24/%D0%94%D0%B5%D0%BA%D0%BB%D0%B0%D1%80%D0%B0%D1%86%D0%B8%D1%8F_%D0%92%D0%A3%D0%A6.pdf) [Date accessed 26.04.2019].
- Enakiyev, F. E. (1912). *Saint Petersburg transformation challenges*. Saint Petersburg: R. Golike and A. Vilborg Association Publishing House, 84 p.
- Fanaylova, Ye. (2007). *Urban environment*. [online] Available at: <https://www.svoboda.org/a/397117.html> [Date accessed 04.12.2019].
- Fomina, Ye. (2014). *Districts, blocks, residential units*. [online] Available at: <https://www.novayagazeta.ru/articles/2014/05/23/59674-rayony-kvartaly-zhilye-massivy> [Date accessed 10.06.2019].
- Gutnov, A. E. (1984). *Evolution of urban planning*. Moscow: Stroyizdat, 256 p.
- Grabar, I. E. (1910). *History of Russian art. Vol. III. Architecture. Saint Petersburg architecture in the 18<sup>th</sup> – the first third of the 19<sup>th</sup> century*. Moscow: Joseph Knebel Publishing House, 584 p.
- Ikonnikov, A. V. (1965). The old and the new in the urban ensemble. *Stroitelstvo i Arkhitektura Leningrada*, 9, p. 11.
- Karpovka (2017). *Ecologists create a noise map of Saint Petersburg*. [online] Available at: <https://karpovka.com/2017/10/31/347975/> [Date accessed 10.02.2019].
- Kirikov, B. M. (2004). *Saint Petersburg's architectural and historical heritage sites*. Petrogradsky District. Saint Petersburg: Kolo Publishing House, 584 p.
- Kirikov, B. M. (2014). *The architecture of Petersburg and Leningrad*. Saint Petersburg: Kolo Publishing House, 400 p.
- Kogan, L. B. (1982). *Social and cultural functions of a city and its spatial environment*. Moscow: Stroyizdat, 177 p.

- Kommersant (2018). *The number of passenger cars in Russia has increased by 50% over the course of 10 years*. [online] Available at: <https://www.kommersant.ru/doc/3534911> [Date accessed 07.11.2019].
- Kovalev, D. S. (2019). Environmental assessment of the living environment of pre-revolutionary apartment houses of St. Petersburg. *PNRPU Bulletin. Urban development*, 1, pp. 79–102. DOI: 10.15593/2409-5125/2019.01.06.
- Kozhaeva, L. B. (2011). Construction morphotypes in theory and practice. *Arkhitekturny Vestnik*, 4, pp. 43–47.
- Kozyreva, Ye. I. (2015). The Saint-Petersburg quarter: space and world. *Vestnik of Saint Petersburg University. Arts (Series 15)*, 3, pp. 44–65.
- Kudin, N. (2019). *Posts and chains only. The GIBDD's idea of danger and the city council's idea of beauty keep colliding on Nevsky Prospekt*. [online] Available at: <https://www.fontanka.ru/2019/08/16/097/> [Date accessed 27.12.2019].
- Lapechenkova, I. (2013). *In a golden cage: the pros and cons of living in Saint Petersburg*. [online] Available at: [http://www.rbc.ru/spb\\_sz/29/11/2013/5592aa129a794719538d1204](http://www.rbc.ru/spb_sz/29/11/2013/5592aa129a794719538d1204) [Date accessed 18.02.2020].
- Lavrov, L. P., Laushkina, A. A. and Pitayev, V. P. (1981). On assessing the quality and cost-effectiveness of living premises. *Zhilishchnoe Stroitel'stvo (Housing Construction)*, 11, pp. 5–7.
- Likhacheva, L. (2001). On the thoroughfares of Saint Petersburg. *Nauka i Zhizn*, 5. [online] Available at: <https://www.nkj.ru/archive/articles/5898/> [Date accessed 16.02.2019].
- Linov, V. K. (2012a). Development problems of public spaces in the historic centre of Saint-Petersburg. *Bulletin of Civil Engineers*, 4, pp. 42–47.
- Linov, V. K. (2012b). Forms and methods of public space development in the historic centre of Saint-Petersburg. *Bulletin of Civil Engineers*, 5, pp. 17–22.
- Lisovsky, V. G. (2004). *Architecture of Saint Petersburg. Three centuries of history*. Saint Petersburg: AO Slaviya, 416 p.
- Lynch, K. (1982). *The image of the city*. Ed. by A. V. Ikonnikov. Moscow: Stroyizdat, 328 p.
- Lynch, K. (1986). *A Theory of Good City Form*. Moscow: Stroyizdat, 264 p.
- Makhrovskaya, A. V. (1974). *The reconstruction of old residential blocks in large cities (as exemplified by Leningrad)*. Leningrad: Stroyizdat, Leningrad Department, 192 p.
- MLA+ (2019). *Untapped Saint Petersburg. A study of the urbanized territory potential*. [online] Available at: <https://www.mlaplus.com/wp-content/uploads/2019/02/Densification-possibilities-for-St.-Petersburg.pdf> [Date accessed 21.07.2019].
- Nikolayenko, S. (2015). *The per capita number of cars in Dubai is higher than in London or New York*. [online] Available at: <https://replyua.net/novosti-v-mire/3208-v-dubae-bolshe-mashin-na-dushu-naseleniya-chem-v-londone-ili-nyu-yorke.html> [Date accessed 07.11.2019].
- Official Website of Legal Information (2019). *On the Transportation Strategy of Saint Petersburg up to 2025. Government of Saint Petersburg*. Decree No. 945 dd. July 13, 2011. [online] Available at: <http://pravo.gov.ru/proxy/ips/?docbody=&nd=131043008&rdk=0> [Date accessed 12.04.2019].
- Olkhovskaya, U. (2012). *Peculiarities of the national construction*. [online] Available at: <http://expert.ru/siberia/2012/04/osobennosti-natsionalnogo-stroitelstva/> [Date accessed 29.05.2017].
- Pavlikova, A. (2013). *Priority to block-based construction*. [online] Available at: <https://archi.ru/russia/50044/prioritet-kvartalnoi-zastroike> [Date accessed 25.07.2019].
- Platonov, G. D., Muravyova, I. Yu., Lamekin, L. A. (1973). *Types of houses and apartments for future-oriented construction in a large city (defining living premises structure with a computer, as exemplified by Leningrad)* (overview). Moscow: Publishing House of the Center of Scientific and Technical Information on Civil Engineering and Architecture, 45 p.
- Punin, A. L. (1990). *Architecture of Saint Petersburg in the mid-19<sup>th</sup> century*. Leningrad: Lenizdat, 351 p.



Reglement sur les hauteurs et les sail lies des batiments dans la villc be Paris 18 sept. 1902. Arrete du 22 Juin, 1904.

Repository for legal documents, standards, regulations and specifications (2019a). *On the green spaces in Saint Petersburg. Law of Saint Petersburg No. 396-88 dd. June 28, 2010 (amended on November 30, 2018)*. [online] Available at: <http://docs.cntd.ru/document/891832426> [Date accessed 01.11.2019].

Repository for legal documents, standards, regulations and specifications (2019b). *On the Saint Petersburg Strategy for Preserving the Cultural Heritage. Decree of the Saint Petersburg Government No. 1681 dd. November 1, 2005*. [online] Available at: <http://docs.cntd.ru/document/8421327> [Date accessed 21.02.2020].

RBC (2018). *Russia is working on territorial development principles. What does it mean?* [online] Available at: <https://realty.rbc.ru/news/5a9cebc9a79474c042d64f1> [Date accessed 10.06.2019].

Roslavlev, M. (1928). *Old Petersburg – New Leningrad*. Leningrad: Academy of Arts Publishing House, 132 p.

Saint Petersburg Projects (2019). Program for the renovation of the historical center. [online] Available at: <http://spb-projects.ru/forum/viewtopic.php?t=2573&sid=60b91a3e819a6defe01198f1ddee3928> [Date accessed 11.05.2019].

Saint Petersburg Union of Restorers (2019). *Defining the boundaries of Saint Petersburg's historical center*. [online] Available at: <http://srspsb.ru/article.php?id=207&mode=ar> [Date accessed 15.07.2019].

Sementsov, S. V. (2006a). Stages of forming of Saint Petersburg spatial pattern. Part 1. *Bulletin of Civil Engineers*, 2, pp. 15–20.

Sementsov, S. V. (2006b). Stages of forming of Saint Petersburg spatial pattern. Part 2. Historical development of land plots (layout and development systems) and their regulation. *Bulletin of Civil Engineers*, 3, pp. 21–26.

Shesterneva, N. N. (2007). *Architectural typology and development principles of the pedestrian paths that currently exist in the largest city: a case study of Saint Petersburg*. PhD Thesis in Architecture. Saint Petersburg: Saint Petersburg State University of Architecture and Civil Engineering.

Shundrina, Yu.A. (2017). *Surface waters in St. Petersburg*. [online] Available at: <http://ecopeterburg.ru/2017/12/05/%D0%BF%D0%BE%D0%B2%D0%B5%D1%80%D1%85%D0%BD%D0%BE%D1%81%D1%82%D0%BD%D1%8B%D0%B5-%D0%B2%D0%BE%D0%B4%D1%8B-%D0%BD%D0%B0-%D1%82%D0%B5%D1%80%D1%80%D0%B8%D1%82%D0%BE%D1%80%D0%B8%D0%B8-%D1%81%D0%B0%D0%BD/> [Date accessed 01.11.2019].

Shvidkovsky, D. (2007). *Russian architecture and the West*. New Haven, London: Yale University Press, 480 p.

Studme.org (2019). *City street and road network*. [online] Available at: [https://studme.org/96669/logistika/ulichno-dorozhnaya\\_set\\_gorodov](https://studme.org/96669/logistika/ulichno-dorozhnaya_set_gorodov) [Date accessed 27.12.2019].

UNESCO (2019). *Historic Centre of Saint Petersburg and Related Groups of Monuments*. Available at: <https://whc.unesco.org/en/list/540/documents/> [Date accessed 10.12.2019].

Urban Environment Quality Index (2019). *Urban Environment Quality Index — a tool to assess the quality of the tangible urban environment and conditions of its formation*. [online] Available at: <https://индекс-городов.рф/#/> [Date accessed 21.12.2019].

Vysokovsky, A. A. (1989). *Environmental approach in architecture and urban planning*. Moscow: All-Union Research Institute of the Theory of Architecture and Urban Planning, 157 p.

Yandex.Realty (2019). *How the air quality in Moscow and Saint Petersburg has changed over the course of a year*. [online] Available at: <https://realty.yandex.ru/spravochnik/kak-izmenilos-kachestvo-vozdukha-v-moskve-i-sankt-peterburge-za-god> [Date accessed 12.12.2019].

Yasin, E. G. (2006). The Political Economy of the Housing Reform. *Ekonomicheskaya Politika / Economic Policy*, 2, pp. 95–119.

Yargina, Z. N., Kositsky, Ya. V., Vladimirov, V. V., Gutnov, A. E., Mikulina, Ye. M., Sosnovsky, V. A. (1986). *Basics of urban planning theory*. Moscow: Stroyizdat, 326 p.

Yavein, N. (2012). *Inner Petersburg*. [online] Available at: <http://archplatforma.ru/?act=2&tgid=1558&stchng=2> [Date accessed 26.01.2020].

Yemtsov, A. (2019). *Saint Petersburg district ratings: population density, crime level, and quality of life*. [online] Available at: <https://saint-petersburg.ru/m/society/emtsov/371374/> [Date accessed 15.02.2020].

Yukhnyova, Ye. D. (2008). *Saint Petersburg revenue houses. Glimpses of living history*. Moscow: Tsentrpoligraf, 362 p.

Za Rulem (2019). *The wheels of the Russian Empire: our motor industry before the revolution*. [online] Available at: <https://www.zr.ru/content/articles/908958-kolesa-rossijskoj-imperii/> [Date accessed 07.11.2019].

## ОБ ОЦЕНКЕ СОСТОЯНИЯ ГОРОДСКОЙ СРЕДЫ ИСТОРИЧЕСКОГО ЦЕНТРА САНКТ-ПЕТЕРБУРГА

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### Аннотация

Публикация инспирирована внедрением индекса качества городской среды в систему Минстроя РФ. Отмечается, что методики, основанные на «средовом подходе», в Ленинграде прорабатывались и использовались при исследовании жилища уже в 1970-1980-е годы, а сейчас этот опыт можно использовать для анализа современного состояния городской среды. **Цель исследования и методы:** Настоящая публикация представляет обзор информации, позволяющей получить первое представление о материальной городской среде в историческом центре Санкт-Петербурга. Многие показатели напоминают о других европейских метрополиях, но сказывается то, что территория центра разделена на три части широкими водными просторами, что застройка началась на пустынной территории, а на активный этап ее развития приходится всего полтора столетия (1760-е -1910-е годы). **Результаты:** С привлечением количественных данных дается характеристика исторического центра Санкт-Петербурга, которая сопоставляется с европейскими метрополиями по показателям геометрии пространств, транспортно-пешеходных коммуникаций и экологического состояния и показывает наличие проблем, усложняющих жизнедеятельность населения в этой части города. Критике подвергаются региональные нормативы реконструкции и застройки исторически сложившихся районов, которые основаны на субъективной оценке ситуации и не определяют путей ее оптимизации.

### Ключевые слова

Исторический центр Санкт-Петербурга, городская среда, многофакторный анализ, городское планирование.